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ZOOLOGY.

On Nectonema agile Verrill.[1]—WARD, H. B.—Dr. Ward's paper upon this curious nematode has been awaited with considerable interest by all who heard his preliminary paper given before the Society of American Morphologists last winter, and, in justice to Dr. Ward and Prof. Mark, in whose laboratory the work was done, it must be said the paper is up to our expectations. Many curious thread-worms have been described heretofore, but helminthologists have generally been able to give homologies in other species for all the organs mentioned. Verrill's curious *Nectonema*, however, is a worm which possesses certain structures which are totally foreign to other nematodes.

According to Ward, *Nectonema* is a long (50–200 mm.), slender and exceedingly active round worm, found swimming at the surface of the sea with a rapid, undulatory motion. The anterior portion of the body is semi-transparent, and internally an anterior chamber is divided from the general body cavity by a partition which is concave anteriorly. This anterior chamber, together with its contents, is the most interesting part of the animal in question, for it is a structure which we cannot at present homologize with any organ of other nematodes. It is traversed by the rudimentary œsophagus, and contains ventrally the brain, while the dorsal space is occupied by four large conical cells which send processes down into the nervous matter of the brain. These cells are looked upon by Brüger as gland cells, but Ward supports the view that they are ganglion cells, which were situated on the surface of the brain, have become enormously large, and have extended up above the brain into the lumen of the anterior chamber. At first thought this supposition would seem rather far fetched, but, curiously enough, Ward has shown that there are in the brain five pairs of large ganglion cells which are quite constant in their position and which resemble these two pairs of dorsal cells in certain respects; *the fifth pair of cells is only half in the brain and half projecting above it, thus apparently forming the first stage in the migration which the dorsal cells have already accomplished.*

The digestive tract is quite rudimentary, and, as Ward states, points directly to the view that *Nectonema* is, in all probability, a parasite during the earlier part of its life.

[1] Bulletin Mus. Comp. Anat., Cambridge. 1892. Vol. xxiii, p. 135–188, with 8 plates.

In regard to the position of this worm in the classification, Ward believes that it is more closely allied to *Gordius* than to any other known nematode. The general structure, the ventral nerve cord, the anal ganglion, the absence of lateral lines, and the dorsal position of the sexual organs, together with the terminal openings of the same, all tend to support this view.

For other interesting details in regard to *Nectonema,* we must refer to the original article. At the same time we wish to call attention to the American *Gordiidæ* and Mermithidæ which would afford a most interesting and valuable field for scientific work. They should be worked up from the systematic, embryological and anatomical standpoints, and the reviewer thinks, judging from the admirable way in which Dr. Ward has studied this closely allied form *Nectonema,* that Ward is in an especially good position to revise these two families. Reviewer would hence take the liberty of suggesting the revision to Dr. Ward as a field for future investigation.—C. W. S.

Linton on Entozoa.[2]—Dr. Linton has recently published the results of his studies on the following parasites of birds:

1. *Filaria serrata* sp. n. is described from the intestine of *Circus cyaneus hudsonius.* The description is based upon a single male specimen, and is very incomplete. In the figures of the head two slings are drawn, which, if the drawing is correct, would probably place the species in the genus Dispharagus. But as Linton does not make any statements in regard to the œsophagus, the original material must be re-examined to determine this point.

2. *Ascaris spiculigera* R. was found in *Pelecanus erythrorhynchus.*

3. *Echinorhynchus rectus* sp. n. is described from *Larus sp.*

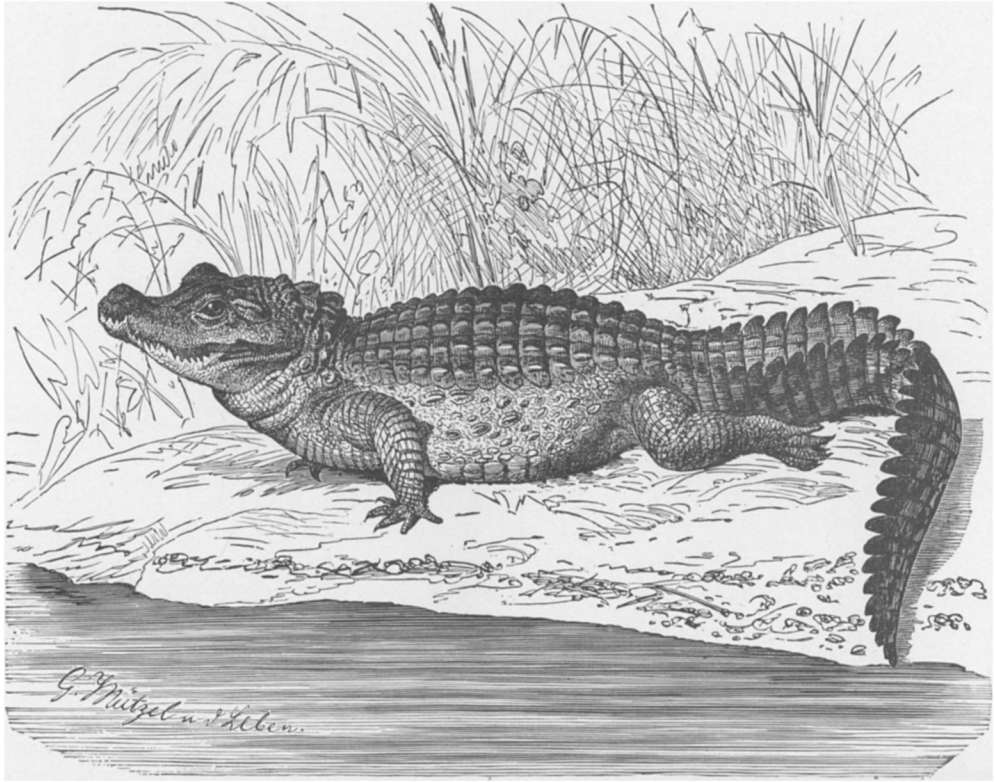
4. *E. striatus* Goeze was found in the intestine of *Oedemia americana.*

5. *Holostomum variabile* Nitzsch, found in several species of birds.

6. *Distomum (?) verrucosum* sp. n. Under this name the author describes a fluke found in the intestine of *Larus californicus.* As basis for the description, Linton had one entire specimen and a fragment of a second specimen. Unfortunately, he has made the mistake to start with, of choosing a specific name which has already been applied to three other species of the same genus (*D. verrucosum* Molin, from *Labrax lupus; D. verrucosum* Poirier, from *Thynnus vulgaris,* and *D. verrucosum* Busch, from *Ophidium barbatum*). Von Linstow gives these three in his Nachtrag (Compendium der Helminthologie,) as different species. I have not the articles at hand at present, so cannot state

[2] Notes on Avian Entozoa (Proc. U. S. Nat. Mus., Vol. xi, pp. 87–113, Pls. iv–vii.)

PLATE XXX.



Osteolaemus tetraspes. The African Alligator Crocodile.

whether any two of them are identical with each other or similar to Linton's species. At any rate, the name is clearly preoccupied, and it is inconceivable how Linton could give the same name to a fourth species which he describes as new.

7. *Distomum flexum* sp. n. from *Oedemia americana.*

8. *Dibothrium cordiceps* Leidy. *Larus californicus* as a new host.

9. *D. exile* sp. n., from *L. californicus.*

EPISION gen. nov. Diagnosis: "Anterior end of body (head) lamellate, more or less crispate, deflected. Body proper, tæniæ form, segmented, segments not distinct. Reproductive apertures lateral (?)."

Epision is, without doubt, identical with *Tænia malleus* Goeze, 1782. Since Goeze's time, the parasite has been mentioned by Zeder, 1800; Frölich, 1802; Rudolphi, 1808, 1810, and 1819; Bremser, 1824; Creplin, 1839; Dujardin, 1845; Schlotthauber, 1860; Krabbe, 1869; Krefft, 1871. It has been figured by four of these authors.

10. *E. plicatus* sp. n., from *Oedemia americana.*

11. *Tænia* sp. fragments from *Larus* sp. and *Colymbus* sp.

12. *Tænia porosa* R. from *L. californicus.*

13. *T. filum* Goeze, from *L. californicus.*

14. *T. macrocantha* sp. n., from *Oe. americana.*

15. *T. compressa* sp. n., from *Fuligula vallisneria.*

It must be confessed that Linton's paper is a disappointment, and far inferior to his papers on the parasites of fish. Although he has given good descriptions of the external appearance of the parasites, measurements, etc., yet he has said almost nothing about the internal organs. In fact, he has described as a new species of *Dibothrium,* a form in which no genital organs were developed; while in his supposed new genus he cannot even give the position of the genital pores with certainty, and tells us practically nothing in regard to the genital glands. In the case of *T. filum, T. macrocantha* and *T. compressa,* an attempt is made to figure the genital organs, but the figures are very poor, too small and do not contain enough detail. We are told nothing of the number of testicles or of the topographical relations of the various organs.

The time has now passed when an helminthologist is justified in creating new species or new genera of tape-worms on external form alone, especially when only one or two specimens are at his disposal. If specimens of Linton's species were sent to me for determination, and I knew the hosts from which they came, I might be able to determine the various forms; but I must confess that if the parasites alone were sent, with no statement as to where they came from, it would be practically impossible to recognize the species. Even with the forms

with which I am best acquainted, i. e., with the parasites of man and the domestic animals, I rarely trust myself to diagnose a tape-worm without first examining the anatomy of the segment, for I have found that after examining no less than 1200 tape-worms of cattle and sheep, it is the easiest thing in the world to make mistakes such as diagnosing a *Moniezia planissima* as *M. expansa* or as some other species. The helminthologists all over the world have now recognized the uncertainty of external form, in determining Cestodes and Trematodes, and are revising the orders with reference to their anatomy; and with this movement in full force, I cannot understand how such an exact observer as Linton now allows himself to publish new species based on the external appearance of one or two specimens. It must, of course, be admitted that he could probably recognize the species again, since he has studied the type, but he should remember that his colleagues cannot obtain the same impressions from any description, no matter how good it may be, which he obtains from seeing and studying the original animals.

It is to be hoped that our friend, Dr. Linton, will obtain more material of the species he has described, and that he will favor us with exact accounts of their internal topographical anatomy.

—C. W. STILES.

Systematic Arrangement of the Families of Birds.[3]—Prof. Max Fürbringer calls attention to Dr. L. Stejneger's systematic arrangement of the families of birds as adopted in the *Standard Natural History.* Although Fürbringer differs in his ideas from Stejneger, he expresses his "volle Bewunderung" at the latter's system, and continues, "Es ist die ernste That eines hervorragenden, in seiner Methodik auf den rechten Bahnen wandelnden Forschers and Denkers und verdient als solche den besten neueren Vogelsystemen gleich gestellt zu werden."

Shufeldt on the Anatomy of the Humming-Birds and Swifts.—In his review of my popular monograph of the humming-birds, in the October NATURALIST, Dr. Shufeldt declares my description of the humming-bird's tongue to be erroneous, and "kindly invites" my attention "to the very careful dissections made by the Scotch anatomist, W. MacGillivray," and also his own "extensive dissections," the results of which were published in *Forest and Stream* for July 14, 1887, p. 581. The inference clearly is that Dr. Shufeldt would have me appear ignorant of both these treatises, though he should know that I am

[3] Journal für Ornithologie, April, 1892.

quite as familiar with them as he is himself. The facts of the case are that my purposely brief description, which Dr. Shufeldt criticizes so harshly and unnecessarily, is substantially a condensation of MacGillivray's—my knowledge of the subject being based chiefly on the latter and Mr. F. A. Lucas' later dissections of thirteen species[4] (instead of one, as in the case of Dr. Shufeldt's "extensive dissections").

Dr. Shufeldt's peculiar notion that the swifts are more nearly related to the swallows than to the humming-birds, first set forth by him in 1883, was so thoroughly "exploded" by his reviewers[5] that his resurrection of so dead an issue surprises me. Apparently he is not familiar with the literature of the subject, for, if he were posted, he would know that leading authorities on avian comparative anatomy are overwhelmingly if not unanimously against his side of the question. I would therefore suggest that he consult Fürbringer, Parker, Garrod and Gadow, and thus discover how much he has to learn regarding the matter which he handles with so much assurance. Even a careful perusal of Huxley (whom, by some strange hallucination, he imagines his abettor) may also prove instructive to him.—ROBERT RIDGWAY.

[4] Cf. Proceedings U. S. Nat. Mus. Vol. xiv., No. 848, pp. 169–172, pl. iv.

[5] Cf. Stejneger, *The Auk.*, July, 1886, pp. 404–406, and Lucas, *The Auk.*, October, 1886, pp. 444–451.